AMENDMENTS TO THE CLAIMS

Listing of Claims:

1. (Withdrawn) Optical alignment apparatus, comprising:

an optical element comprising a curved surface; and

an optical bench, comprising a mounting surface for mounting of an optical component thereon and having an opening formed in the mounting surface, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element with the optical component by relative rotation of the optical element within the opening while the curved surface is engaged by the opening.

2. (Withdrawn) The apparatus according to claim 1, wherein the curved surface has a center of curvature, and wherein the size and shape of the opening are such as to permit the alignment by rotation of the optical element about the center of curvature.

3. (Withdrawn) The apparatus according to claim 1, and wherein the opening has a position in the mounting surface relative to the optical component so as to permit the alignment of the optical element with the component.

4. (Withdrawn) The apparatus according to claim 1, wherein the size and shape of the opening permit the alignment of the optical element with the component by translation of the optical element within the opening while the curved surface is engaged by the opening.

5. (Withdrawn) The apparatus according to claim 1, wherein the curved surface performs at least one of refraction, reflection, and diffraction of electromagnetic (EM) radiation incident thereon, and wherein the alignment comprises adjusting a path of the radiation between the component and the optical element.

6. (Withdrawn) The apparatus according to claim 1, wherein the optical element comprises a region within the optical element that is adapted to perform at least one of refraction, reflection and diffraction of EM radiation incident on the region, and wherein the alignment comprises adjusting a path of the EM radiation between the region and the component.

7. (Withdrawn) The apparatus according to any of claims 1-6, wherein the mounting surface comprises a surface having predetermined dimensions.

8. (Withdrawn) The apparatus according to any of claims 1-7, wherein the mounting surface comprises a planar surface.

9. (Withdrawn) The apparatus according to any of claims 1-8, wherein the mounting surface comprises at least one of a stepped planar surface, a plane ramp, and a curved surface.

10. (Withdrawn) The apparatus according to any of claims 1-9, wherein the curved surface is engaged by the opening at one or more support regions, and comprising fixing the optical element to the opening while the curved surface is engaged by the opening at the one or more support regions.

11. (Withdrawn) The apparatus according to claim 1, wherein the relative rotation comprises at least one of rotating the optical element and maintaining the optical bench stationary, rotating the optical bench and maintaining the optical element stationary, and rotating the optical element and the optical bench.

12. (Withdrawn) The apparatus according to claim 1, and comprising one or more actuators which are configured to contact the curved surface, and which are adapted to perform the relative rotation as one of two or more rotations orthogonal to each other.

13. (Withdrawn) The apparatus according to claim 12, wherein the one or more actuators comprise two actuators distributed symmetrically with respect to the optical element.

14. (Withdrawn) The apparatus according to claim 1, wherein the curved surface comprises at least one further surface configured thereon, and wherein the alignment comprises adjusting a path of EM radiation transferred between the at least one further surface and the component.

15. (Withdrawn) The apparatus according to claim 14, wherein the at least one further surface comprises a plane surface, and wherein the path comprises the plane surface and a region of the curved surface.

16. (Withdrawn) The apparatus according to claim 14, wherein the at least one further surface comprise a first plane surface and a second plane surface parallel to the first plane surface, and wherein the path comprises the first and the second plane surface.

17. (Withdrawn) The apparatus according to claim 14, wherein the at least one further surface comprises a reflecting surface.

18. (Withdrawn) The apparatus according to claim 14, wherein the curved surface has a first curvature, and wherein the at least one further surface comprises a further curved surface having a second curvature different from the first curvature, and wherein the path comprises the further curved surface and a region of the curved surface.

19. (Withdrawn) The apparatus according to any of claims 1-12, and comprising an internal optical element configured within the optical element, and wherein an optical element opening to the internal optical element is configured within the curved surface.

20. (Withdrawn) The apparatus according to claim 19, wherein the optical element opening is configured to enable at least one of access to the internal optical element and passage of EM radiation between the optical component and the internal optical element.

21. (Withdrawn) The apparatus according to claim 19, wherein the internal optical element comprises at least one of a reflective element, a refractive element, and a diffractive element.

22. (Canceled)

23. (Previously Amended) The method according to claim 36, wherein the curved surface has a center of curvature, and wherein the size and shape of the opening are such as to permit the alignment by rotation of the optical element about the center of curvature.

24. (Previously Amended) The method according to claim 36, wherein the size and shape of the opening permit the alignment of the optical element with the component by translation of the optical element within the opening while the curved surface is engaged by the opening.

25. (Previously Amended) The method according to claim 36, wherein the curved surface performs at least one of refraction, reflection, and diffraction of electromagnetic (EM) radiation incident thereon, and wherein the alignment comprises adjusting a path of the radiation between the component and the optical element.

26. (Previously Amended) The method according to claim 36, wherein the curved surface comprises at least one further surface configured thereon, and wherein the alignment comprises

adjusting a path of EM radiation transferred between the at least one further surface and the component.

27. (Previously Amended) The method according to claim 36, wherein the optical element comprises a region within the optical element that is adapted to perform at least one of refraction, reflection and diffraction of EM radiation incident on the region, and wherein the alignment comprises adjusting a path of the EM radiation between the region and the component.

28. (Previously Amended) The method according to claim 36, and comprising configuring an internal optical element within the optical element, and configuring an optical element opening to the internal optical element within the curved surface.

29-31. (Canceled)

32. (Withdrawn) Optical alignment apparatus, comprising:

a holder comprising a curved surface;

an optical element which is mounted on the holder; and

an optical bench, comprising a mounting surface for mounting of an optical component thereon and having an opening formed in the mounting surface, the opening having a size and shape suitable to engage the curved surface of the holder so as to permit alignment of the optical element with the optical component by relative rotation of the holder within the opening while the curved surface is engaged by the opening.

33. (Withdrawn) Optical alignment apparatus, comprising:

an optical element comprising a curved surface; and

an optical bench, comprising a mounting surface for mounting of an optical component thereon and for engaging the curved surface of the optical element so as to permit alignment of the optical element with the optical component by relative rotation of the optical element on the mounting surface while the curved surface is engaged thereon.

34. (Withdrawn) Optical alignment apparatus, comprising:

a holder comprising a curved surface;

an optical element which is mounted on the holder; and

an optical bench, comprising a mounting surface for mounting of an optical component thereon and for engaging the curved surface so as to permit alignment of the optical element with the optical component by relative rotation of the holder on the mounting surface while the curved surface is engaged thereon.

35. (Canceled)

36. (Currently Amended) A method for optical alignment, comprising:

~~providing~~ mounting an optical element comprising a curved surface on a mounting surface of an optical bench;

mounting an optical component on [[a]] said mounting surface ~~of an optical bench~~, said mounting surface forming an opening having a size and shape suitable to engage the curved surface of the optical element; and

~~engaging the curved surface of the optical element with the mounting surface so as to permit alignment of~~ aligning the optical element with the optical component by relative rotation of the optical element on the mounting surface while the curved surface is engaged therewith; and

fixing the optical element to said opening while the curved surface is engaged in said opening to maintain the alignment achieved by the rotation of the optical element relative to the optical component..

37. (Canceled)

38. (Withdrawn) Optical alignment apparatus, comprising:

an optical element comprising a curved surface; and

an optical bench, comprising a mounting surface having an opening formed in the mounting surface, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element with an optical component fixed in relation to the optical bench by relative rotation of the optical element within the opening while the curved surface is engaged by the opening.

39. (Withdrawn) The apparatus according to claim 38, wherein the curved surface has a center of curvature, and wherein the size and shape of the opening are such as to permit the alignment by rotation of the optical element about the center of curvature.

40. (Withdrawn) The apparatus according to claim 38 or claim 39, and comprising one or more actuators coupled to the optical bench, the one or more actuators being adapted to perform the relative rotation.

41. (Withdrawn) The apparatus according to claim 40, wherein the one or more actuators are embedded in the optical bench.

42. (Withdrawn) The apparatus according to claim 40, wherein the one or more actuators are attached to the optical bench.

43. (Withdrawn) The apparatus according to claim 40, wherein the one or more actuators contact the curved surface.

44. (Withdrawn) The apparatus according to claim 40, wherein the one or more actuators produce surface waves which contact the curved surface.

45-51. (Canceled)

52. (New) A method for optical alignment, comprising:

providing an optical element comprising a curved surface; and

mounting an optical component on a mounting surface of an optical bench;

forming an opening in the mounting surface, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element with the optical component by rotation of the optical element within the opening while the curved surface is engaged by the opening, wherein the curved surface is engaged by the opening at one or more support regions; and

fixing the optical element to the opening while the curved surface is engaged by the opening at the one or more support regions.

53. (New) A method for optical alignment, comprising:

providing an optical element comprising a curved surface; and

mounting an optical component on a mounting surface of an optical bench;

forming an opening in the mounting surface, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element

with the optical component by rotation of the optical element within the opening while the curved surface is engaged by the opening; and

contacting the curved surface with one or more actuators which are adapted to perform the relative rotation as one of two or more rotations orthogonal to each other.

54. (New) The method according to claim 53, wherein the one or more actuators comprise two actuators distributed symmetrically with respect to the optical element.

55. (New) A method for optical alignment, comprising:

providing an optical element comprising a curved surface; and

forming an opening in a mounting surface of an optical bench, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element with an optical component fixed in relation to the optical bench by rotation of the optical element within the opening while the curved surface is engaged by the opening, said curved surface having a center of curvature, and wherein the size and shape of the opening are such as to permit the alignment by rotation of the optical element about the center of curvature.

56. (New) A method for optical alignment, comprising:

providing an optical element comprising a curved surface;

forming an opening in a mounting surface of an optical bench, the opening having a size and shape suitable to engage the curved surface of the optical element so as to permit alignment of the optical element with an optical component fixed in relation to the optical bench by rotation of the optical element within the opening while the curved surface is engaged by the opening, and

coupling one or more actuators to the optical bench, the one or more actuators being adapted to perform the relative rotation.

57. (New) The method according to claim 56, wherein coupling the one or more actuators comprises embedding the one or more actuators in the optical bench.

58. (New) The method according to claim 56, wherein coupling the one or more actuators comprises attaching the one or more actuators to the optical bench.

59. (New) The method according to claim 56, wherein the one or more actuators contact the curved surface.

60. (New) The method according to claim 56, wherein the one or more actuators produce surface waves which contact the curved surface.

61. (New) The method according to claim 36, wherein the curved surface is formed by a spherical lens.

62. (New) The method according to claim 61, wherein the spherical lens includes a substantially flat surface that breaks the symmetry of the spherical lens to allow optical alignment by rotation of the spherical lens.

63. (New) The method according to claim 62, wherein both a spherical surface and a flat surface of the lens are in the path of an optical beam passed through the lens to the optical component.

64. (New) The method according to claim 61, wherein the spherical surface of said lens is in contact with the mounting surface.

65. (New) The method according to claim 61, which includes fixing the spherical surface to the mounting surface while the spherical surface is engaged by the mounting surface.

66. (New) A method for optical alignment, comprising:

mounting an optical element comprising a curved surface on a mounting surface of an optical bench, said mounting surface forming an opening having a size and shape suitable to engage the curved surface of the optical element while permitting rotational movement of the optical element relative to the optical component;

mounting an optical component on said mounting surface;

aligning the optical element with the optical component by rotation of the optical element on the mounting surface while the curved surface is engaged therewith, said rotation of said optical element being relative to the optical component; and

fixing the optical element to said opening while the curved surface is engaged in said opening to maintain the alignment achieved by the rotation of the optical element relative to the optical component.